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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/757,410	01/15/2004	Jae-dong Lee	SEC.861D	3377
20987	7590	05/05/2006	EXAMINER	
VOLENTINE FRANCOS, & WHITT PLLC ONE FREEDOM SQUARE 11951 FREEDOM DRIVE SUITE 1260 RESTON, VA 20190			UMEZ ERONINI, LYNETTE T	
			ART UNIT	PAPER NUMBER
			1765	

DATE MAILED: 05/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/757,410

Applicant(s)

LEE ET AL.

Examiner

Lynette T. Umez-Eronini

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 16 February 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 13-16, 18, 19 and 21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 13-16, 18, 19 and 21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

This communication is in response to Applicants' Remarks filed 2/13/2006, in which "a choline derivative" was added to the limitation in (currently amended) Claim 13. Since the former prior art of record failed to address a cmp method comprising using a polishing slurry comprising a choline derivative, as recited in the (original) Claims 17-19, a new art rejection is presented to address the "choline derivative.

#### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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3. Claims 13-15, 18, 19, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyashita et al. (US 6,354,913) in view of Deal (US 5,139,571).

Miyashita teaches polishing a semiconductor wafer or a filmed formed thereon using a polishing agent that comprises an abrasive and water (Abstract). Miyashita further teaches the polishing agent comprises a pH controller such as a water-soluble amine, which includes polyethylene imine (same as applicants' pH controlling agent and polyethylene imine), (column 7, lines 19-53). Miyashita also teaches polishing a semiconductor substrate (column 10, lines 62-64) and the silicon substrate comprises silicon nitride 2 film, silicon oxide film 6 such as BPSG, and polycrystalline silicon film 12 (same as applicants' conductive film). The aforementioned reads on,

A chemical mechanical polishing method, comprising simultaneously removing a conductive layer, a silicon oxide layer and a silicon nitride layer using a polishing slurry comprising an abrasive, deionized water, a pH controlling agent, and polyethylene imine having a molecular structure of  $[-CH_2CH_3N(CH_2CH_2NH_2)-]_x[-CH_2CH_2NH_2-]_y$ , where x and y are 0 or positive integers, **in claims 13 and 21;**

wherein the silicon oxide layer is one selected from the group consisting of a borophosphorosilicate glass (BPSG), a phosphosilicate glass (PSG), a borosilicate glass (BSG), a high density plasma (HDP) silicon oxide layer, an undoped silicate glass (USG), a high thermal (HT)-USG, and a plasma enhanced (PE)-silicon oxide layer, **in claim 14; and**

wherein the silicon nitride layer is a dielectric material having a basic formula of  $Si_3N_4$ , **in claim 15.**

Miyashita differs in failing to teach simultaneously removing a conductive silicon oxide, and a silicon nitride layer using a polishing slurry as recited in **claim 13**.

Since Miyashita's polishing agent is the same as the one claimed by applicants and is used in polishing a semiconductor wafer, which is known to comprise a conductive, silicon oxide and silicon nitride layer, then it would have been obvious to one having ordinary skill in the art at the time of the claimed invention to use Miyashita's polishing agent in the same manner as claimed applicants for the purpose of employing a water-soluble amine that has a weak basicity that tends to be excellent in preservation capability and polishing function when used in a polishing agent (Miyashita, column 7, lines 65-67).

Miyashita further differs in failing to teach a choline derivative, in **claim 13, 18, and 19**.

Deal discloses choline (same as Applicants' choline derivative) is used in a wafer polishing slurry and the polar property of choline improves its ability to wet or spread over the surface of a polished silicon wafer thereby improving the ability to remove material from the wafer (column 3, lines 53- 67).

Since Deal illustrates using a polishing slurry, which comprise choline, then it would have been obvious to one of ordinary skill in the art at the time the invention was made to employ choline in a polishing slurry as taught by Deal because its use is known in improving the ability to remove material from a wafer. (Deal, column 3, lines 64-67).

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4. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Miyashita (US '913) in view of Deal (US '571) as applied to claim 13 above.

Miyashita in view of Deal differs in failing to teach wherein the polyethylene imine comprises more than 0.02 wt % of the polishing slurry, **in claim 16**.

Since Miyashita in view of Deal illustrate the specific combination of polishing slurry is known, then it would have been obvious to one of ordinary skill in the art at the time the invention was made to select any concentration of (wt %) of polyethylene imine in the Miyashita reference that would effectively accomplish the method of the disclosed composition because it has been held that there is no invention where the difference in proportions is not critical and was ascertained by routine experimentation because the determination of workable ranges is not considered inventive. See *In re Swain and Adams*, 70 USPQ 412 (CPA 1946).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lynette T. Umez-Eronini whose telephone number is 571-272-1470. The examiner is normally unavailable on the First Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571-272-1465. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.

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Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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April 24, 2006

NADINE G. NORTON  
SUPERVISORY PATENT EXAMINER  
